2007 Milwaukee Water Works

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Milwaukee
Water Works

Safe, Abundant Drinking Water.

The Milwaukee Water Works, a self-financing enterprise owned by the City of Milwaukee, provided 35 billion gallons of pure drinking water to Milwaukee and 15 communities in southeastern Wisconsin in 2007.

The utility disinfects Lake Michigan water with ozone and completes treatment with coagulation, settling and filtration. The Milwaukee Water Works is regulated by the Public Service Commission of Wisconsin (PSC), the U.S. Environmental Protection Agency (EPA) and the Wisconsin Department of Natural Resources (DNR).

Nationally Known for Pure Drinking Water

Milwaukee's drinking water is recognized nationally for its high quality. The Milwaukee Water Works invested $210 million in treatment and distribution systems in the past decade to ensure this high quality.

The Milwaukee Water Works performs continuous monitoring of the treatment process and water quality characteristics, collecting thousands of test measurements daily, most of them exceeding what is required. The utility continually meets EPA requirements to test for 90 regulated contaminants and voluntarily tests for over 500 non-regulated contaminants. Most of the contaminants are not detected. Milwaukee was one of the first utilities in the United States to test for pharmaceuticals and personal care products in its source water and treated water.

In January, the EPA notified Milwaukee that its water quality monitoring system was in full compliance five years ahead of time with new regulations to control disinfection byproducts. The Milwaukee Water Works was able to accomplish this as a result of its rigorous water quality monitoring.

The utility maintains interagency relationships with city, state and federal health, and environmental agencies to monitor public health and drinking water quality.

The Value of a Well-run Water Utility

Milwaukee water is a great value. Five gallons of Milwaukee's ozone-purified water cost 1 cent. With an average daily use per person of 50 gallons, the daily cost per person is about 10 cents.

The Milwaukee Water Works reduces the tax rate in the City of Milwaukee. In 2007, the utility made a $7.8 million payment to offset the City tax levy, reducing the tax rate by $0.26 per thousand dollars of assessed valuation. The utility pays other City departments for services it uses and for the payment of employee benefits.

While public health is the primary consideration in the delivery of Milwaukee water, the Milwaukee Water Works systems are designed to also provide enough water to suppress a major fire anywhere in the service area.

Utility Organization

Water Treatments Plants. The Milwaukee Water Works disinfects Lake Michigan water at two treatment plants. The Linnwood Treatment Plant has a rated capacity of 275 million gallons per day (MGD) and the Howard Avenue Water Treatment Plant has a rated capacity of 105 MGD. Average pumpage by the utility in 2007 was 115 MGD.

Water Quality Section. Chemists, microbiologists and laboratory technicians conduct continuous process control monitoring and validate the measurements in the laboratories. The Water Quality Section is proactive in expanding its monitoring of unregulated contaminants and its screening program to include Endocrine Disrupting Compounds, brominated flame retardants and pharmaceuticals.

Distribution. Field crews focus on scheduled preventive maintenance and emergency repairs to the underground water piping system throughout

Milwaukee and the utility's retail customer suburbs. Distribution crews inspect and maintain approximately 20,000 fire hydrants.

Water Engineering. Water engineers provide an internal resource, responsive to applied research needs and coordinating the Capital Improvements Program (CIP). The CIP projects are planned to increase efficiency and maintain the reliability of the entire Milwaukee Water Works system.

Business Section. Employees working from the Zeidler Municipal Building provide accounting, customer service, billing and collections, and marketing and public outreach.

Meter Services personnel work to ensure that water meters are operating properly and accurately represent water usage. Services include meter reading — both automated and manual — meter testing and repair, and providing emergency water supplies to industrial and commercial customers.

Upgrades to the Milwaukee Water Works Customer Information System provided enhanced flexibility and accounting integrity for fees billed on behalf of the City on the Municipal Services Bill. In 2007, the Milwaukee Water Works began an online payment option using MasterCard or eCheck at its Web site, www.water.mpw.net. Customers gained the option of contacting Milwaukee Water Works through an email address, watwebcs@milwaukee.gov, and may view account balances, make address changes and monitor water use using the Web site.

A Leader in Using Water Wisely

The Milwaukee Water Works, an EPA WaterSense partner, has devised and implemented strategic initiatives in supply-side conservation to optimize water use. The *Using Water Wisely* program, combining operational improvements and public education, has gradually increased savings of treated water to a current estimate of 500 million gallons each year.

Milwaukee has an ample supply of water and treatment capacity. The entire water service area is within the Lake Michigan watershed. As a steward of the resource, the Milwaukee Water Works has focused on supply-side conservation, making improvements to save millions of gallons of water that would take customers decades to equal. Water use in Milwaukee decreased from 50 billion gallons pumped in 1970 to 35 billion gallons pumped in 2007 due to the loss of wet industry and changes in residential use patterns. This is yet another reason to identify and initiate supply-side conservation measures.

The Milwaukee Water Works saved millions of gallons of water and prevented injury and property damage with a multi-year public education campaign to reduce illegally opened fire hydrants. Illegal openings of hydrants wasted an estimated 447 million gallons of treated water in 2006, when 745 illegally opened hydrants were reported during hot weather periods between May and August. A campaign with the Fire and Police Departments and Milwaukee Public Schools, and the installation of hydrant locks, had the desired effect. In 2007, there were 165 illegal openings, wasting an estimated 99 million gallons of water. This was 348 million gallons fewer than in 2006. The water savings continue. The American Water Works Association (AWWA) Wisconsin section presented the Milwaukee Water Works with a 2007 Utility Special Achievement Award for the successful program.

The water treatment plants utilize 40 dual media filters, which require approximately 1,500 backwashes per year. A combination of extending filter run times and optimizing the length of the backwash cycle was piloted in 2004 and implemented in 2005 after it was demonstrated there was no adverse impact to water quality from these process changes. Since 2005, the techniques have saved over 580 million gallons of treated water—165 million gallons each year.

The Milwaukee Water Works provides conservation information to customers. The public education program advises them to watch for and fix leaks and to protect pipes and meters from freezing. Customers can track and compare quarterly water use by accessing their account online at www.water.mpw.net. Each year, staff counsels 2,000 customers about high water use and visits 3,000 homes to identify plumbing leaks. Monthly meter reads of the 1,000 largest customers compare current to past use and any changes in seasonal or monthly patterns are reported for corrective action. Meters are tested for accuracy on a regular basis.

The Milwaukee Water Works also received a 2007 Utility Special Achievement Award from the AWWA Wisconsin section for its campaign, "Only Tap Water Delivers." Launched during the utility's 135th anniversary, the campaign promoted public awareness of the value of a safe and reliable drinking water supply and encouraged community stewardship for maintaining water infrastructure for future generations.

In fall 2007, the Milwaukee Water Works began a public relations program to encourage consumers to *"Drink Locally — Fill at the Tap and Enjoy."* The campaign recognized the convenience of bottled water, but urged consumers to refill at the tap, especially since they have already paid to have the water from their taps treated and pumped.

Sustainability and Energy Efficiency

The Milwaukee Water Works is working to implement sustainable practices and conserve energy throughout its operations.

To help protect the Lake Michigan resource, the Milwaukee Water Works has adjusted its water main and hydrant flushing activities away from rainy periods to dry days to assist the Milwaukee Metropolitan Sewerage District in reducing overflows into the lake.

The Milwaukee Water Works is taking steps to reduce its electrical energy use. To maximize energy savings with the lighting at the two treatment plants and pumping stations, plant electricians have ongoing projects:

- 85-watt compact fluorescents bulbs replaced 500-watt incandescent bulbs.
- Astronomical timers, which adjust settings as daylight periods change, were installed to ensure just the right number of lights are on for the safety of personnel in the skylit filter gallery at night. The same timers were installed on exterior lights of the plant.
- "Walk-through" lighting throughout the plant using timers, switches and motion sensors was installed.

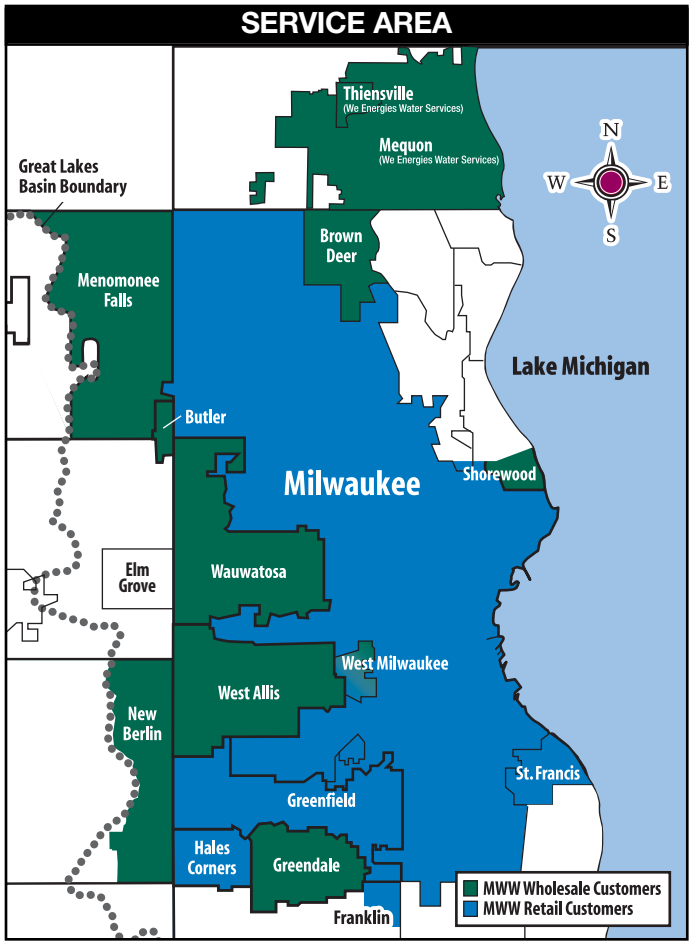
Emphasis is placed on using the most energy efficient pumps for the situation to keep water flow consistent during peak and lower demand times. For example, electrical energy use at a booster station was lowered by installing a variable frequency drive on a station pump. Mechanics developed large motor preventive maintenance schedules to make sure the large motors are running properly and as efficiently as possible.

A new HVAC system at the Meter Repair Shop replaced pneumatic controls with energy efficient digital controls. Ongoing HVAC studies at major facilities will look for energy savings. Roofing projects are designed to include energy payback. All ozone generators have been inspected and are maintained for efficient operations. Generators were modified to turn off the ozone monitors when the generators are on standby, saving energy and chemical use.

Milwaukee Water Works vehicles and equipment that are fueled by diesel have been phasing in increasing concentrations of biodiesel, from 2 percent to 10 percent, with a goal of 20 percent in spring 2008. Hybrid and E85/gasoline formats are purchased for passenger vehicles.

In addition to paper, plastic, glass and aluminum, recycled materials include batteries, fluorescent lighting, concrete and asphalt removed from construction and maintenance sites.

The Milwaukee Water Works was a partner in production of the Simple Solutions to Water Pollution brochure created by Milwaukee WaterPartners, a consortium of regional environmental groups. The utility



Communities receiving retail water service — water, billing services and maintenance of their distribution systems:

Franklin (a portion)
Greenfield
Hales Corners
St. Francis
West Milwaukee (provides its own maintenance)

Wholesale customers receiving only water:

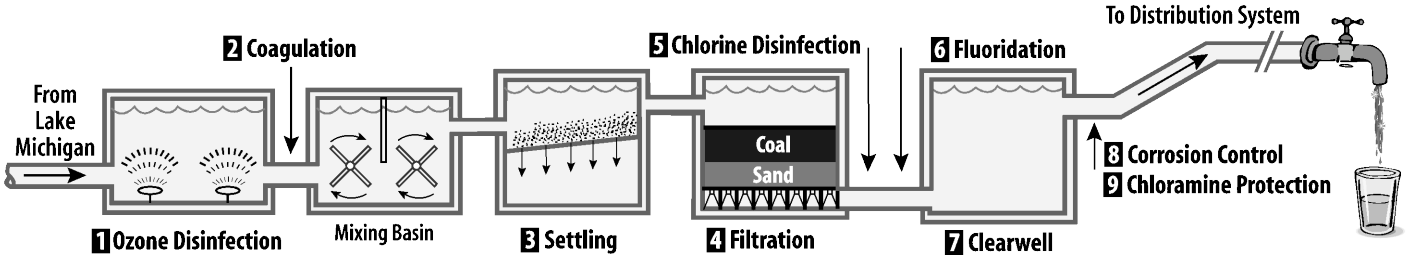
Brown Deer
Butler
Greendale
Menomonee Falls
We Energies Water Services for part of Mequon and Thiensville
Milwaukee County Grounds facilities
New Berlin
Shorewood
Wauwatosa
West Allis

also participated in Lake Michigan beach cleanup programs with Milwaukee Public Schools.

The Milwaukee Water Works takes pride in providing high-quality water to support the regional economy and quality of life in the Milwaukee area. These were some of our largest commercial customers in 2007:

- MillerCoors Brewing
- We Energies
- Milwaukee Public Schools
- D.R. Diedrich & Co. Ltd. (leather products)
- Cargill Meat Solutions Corp.
- University of Wisconsin-Milwaukee
- Marquette University
- Aurora St. Luke's Medical and Aurora Sinai Medical Centers
- Falk Corp.
- U.S. Dept. of Veterans Affairs
- Campbell Soup Supply Co., LLC
- GE Medical Systems
- Master Lock
- Coca Cola Enterprises
- Rockwell Automation
- Joy Global Inc.
- Columbia St. Mary's
- Wisconsin Paperboard Corp.
- The Marcus Corp.
- Fontarôme Chemical, Inc.
- Hydrite Chemical Co.
- Milwaukee Forge
- Wheaton Franciscan Health Care/St. Joseph's Hospital
- Stainless Foundry & Engineering, Inc.
- Henri's Food Products Co. Inc.
- Pereles Bros. Inc. (plastics)
- Masterson Co. (food products and packaging)
- Hercules Inc. (chemicals, plastics)
- Molecular Biology Resources, Inc. (enzymes; non-diagnostic biological products)
- St. Francis Hospital
- Klement Sausage Co.
- Ball Metal Beverage Container Corp.

Milwaukee Water Works Drinking Water Treatment Process



1. **Ozone Disinfection —** Ozone gas is bubbled through the incoming lake water. Ozone destroys disease-causing microorganisms including *Giardia* and *Cryptosporidium,* controls taste and odor, and reduces chlorinated disinfection byproducts.

2. **Coagulation —** Very fine particles in the water adhere together to form larger particles as the coagulant alum is mixed into the water. Large particles are more effectively removed during the settling and filtering processes.

3. **Settling —** Settling is the process in which solid particles settle out and are removed from the water.

4. **Filtration —** The water is slowly filtered through 24" of biologically active anthracite coal and 12" of crushed sand to remove very small particles.

5. **Chlorine Disinfection —** After filters, chlorine is added as a secondary disinfectant. This provides extra protection from potentially harmful microorganisms.

6. **Fluoridation —** Fluoride, when administered at low levels, is proven to help prevent tooth decay.

7. **Clearwell —** Treated water is stored in deep underground tanks and pumped as needed through the distribution system.

8. **Corrosion Control —** A phosphorous compound is added to help control corrosion of pipes. This helps prevent lead and copper from leaching from plumbing into the water.

9. **Chloramine Protection —** Ammonia changes the chlorine to chloramine, a disinfectant that maintains bacteriological protection in the distribution system.

2007 Statistics

General Information about Milwaukee

Altitude (City datum)....581.2 feet
City area....96.1 square miles
Geographic center....N. 42nd St. and W. North Ave.
Shoreline of Lake Michigan in City....10.2 miles
Incorporated by Wisconsin Charter....January 31, 1846

General Information about Milwaukee's Infrastructure

Alleys, total....415 miles
Freeways....40.1 miles
Paved City streets....1,424 miles
Unpaved City streets....14 miles
Total City streets....1,438 miles
Miles of lighted streets....1,289.73 miles
City maintained bridges....204
Movable bridges....21
Total bridge openings....13,163
Total sewer mileage in operation (sanitary, storm and combined)....2,442
Streets with interim lighting....81.96 miles
Unlit streets....52.31 miles
Street lighting units....67,447
Alley lighting units....8,925
Traffic control signals....737 intersections
Traffic control signs....109,213
Underground conduit....556.9 miles
Bus stops, signage maintained....4,268

Milwaukee Water Works

Howard Avenue treatment plant rated capacity....105 million gallons per day (MGD)
Linnwood treatment plant rated capacity....275 MGD
Average daily pumpage 2007....115 MGD
Total gallons sold 2006...35.5 billion gallons
Total length of all water mains in service....1,966 miles
# of meters in service....161,746
# of fire hydrants in service....19,632
Population served....858,920
Area served....195 square miles
Average daily use per person....50 gallons
Cost of drinking water:....5.8 for one cent or 100 cubic feet (748 gallons) for $1.27
MWW payment to city for taxes and services used: $7,766,750
Retail customers: (water, billing service, maintenance) Franklin, Greenfield, Hales Corners, St. Francis, West Milwaukee (provides its own maintenance)
Wholesale customers: (water only): Brown Deer, Butler, Greendale, Menomonee Falls, We Energies Water Services for part of Mequon, Thiensville, Milwaukee County Grounds facilities, New Berlin, Shorewood, Wauwatosa, West Allis.

Sanitation

Residential waste collected....182,201 tons
Other solid waste collected....86,171 tons
Recyclables collected....24,017 tons
Compostables collected....29,900 tons
Snowfall (January – December)....77.8 inches
General snow plowings....7
Ice control operations....55
Service requests....105,223

Forestry

Trees on city streets....200,000
Shade trees planted....3,708
Trees pruned....48,515
Trees removed (all causes)....3,453
Stumps removed....3,517
Boulevard medians and green spaces maintained....476 acres
Flowers produced, annuals....320,075
Flowers planted, annuals....143,560
Flowers planted, perennials....2,706
Flowers planted, bulbs....18,000
Shrubs planted....728
Landscaped boulevard medians....121.8 miles
Green spaces maintained....59
Totlots maintained....57
City properties maintained....20
Service requests....21,297

Infrastructure Services – Sewer Design and Maintenance

Sewers examined....92 miles
Sewers cleaned....331 miles
New sewers....4.32 miles
Replacement sewers....11.25 miles
Sewer lining....5.11 miles
Service calls answered....6,942

Fleet Services

Repair orders....31,110
Preventive maintenance inspections performed....7,874
Tires mounted....3,380
Field service calls, tires....3,354
Field service calls, other....9,220
Stockroom activity....4,559,436
Vehicles serviced
Automobiles....102
Vans....161
Pickups....291
Police units....755
Parking enforcement....48
Packers, rear load....132
Packers, front load and roll-off....21
Packers, recycling....49
Tractors....63
Street sweepers....21
Sewer cleaners, flushers, etc....19
Construction equipment....481
Trucks, all other....378
Compressors....82
Vehicle Total....2,604
Non-automotive equipment....1,538
Total Serviced....4,142

Street and Bridge Maintenance

Bridges, inspected....83
Bridges, number of openings....13,163
Pavement seal coating (square yards)....255,426
Asphalt surface by contract (tons)....4,220
Asphalt patching (tons)....10,560
Crack filling (square yards)....399,586